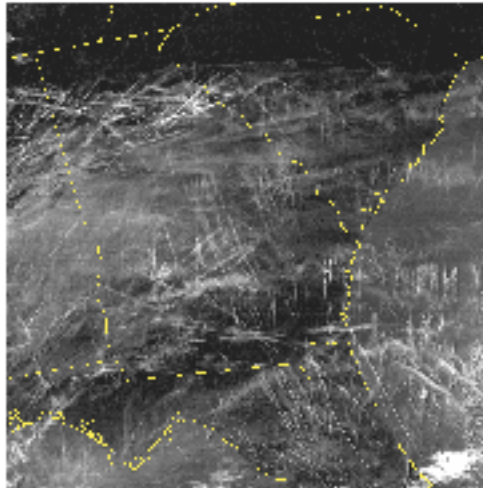


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## Plane exhaust putting heat on climate, research suggests

By Traci Watson, USA TODAY

A study by a NASA researcher suggests that exhaust from planes plays a significant role in the climate of the USA.



Terra satellite image shows contrails over southeastern USA on Jan. 29, 2004.

NASA

Contrails, the thin, white clouds that planes leave behind in the sky, are responsible for a portion of the warming recorded in the USA from 1975 to 1994, says Patrick Minnis of NASA's Langley Research Center in Virginia. During that period, the USA's average temperature rose by 1 degree — hardly a heat wave, but significant by climate standards.

The finding is likely to make contrails, the subject of much research and debate, more of a focus for scientists who monitor the nation's climate. Attention so far has focused on "greenhouse gases," which trap heat in the atmosphere. They are created by the burning of coal, gas and other fossil fuels. The new research provides the best evidence yet that contrails are adding to the warming caused by greenhouse gases. "It suggests we may be having a double whammy here," says Andrew Carleton, a climate expert at Pennsylvania State University. "It's not good news for the Earth when you've got greenhouse gas increases and you've got ... contrails (that) seem to warm the surface of the Earth."

If atmospheric conditions are just right, the contrail can form a cirrus cloud. Such clouds are the feathery ones seen high in the sky. (**Related:** [Contrails from the National Weather Service](#)) No matter how they form, cirrus clouds help warm the Earth's surface by trapping heat, much like a layer of blankets.

Minnis reports that the conditions necessary to create natural cirrus clouds did not become more common from the 1970s to the 1990s. The only other possible cause of the growth in cirrus clouds: the increase in air traffic. He also found that the clouds created by those planes' contrails could have been responsible for nearly all of the 1-degree rise in the USA's average temperature. Minnis acknowledges that it's difficult to calculate exactly how much of the U.S. warming is attributable to contrails. It could be only a small fraction. Even so, he says, the contribution is "significant."